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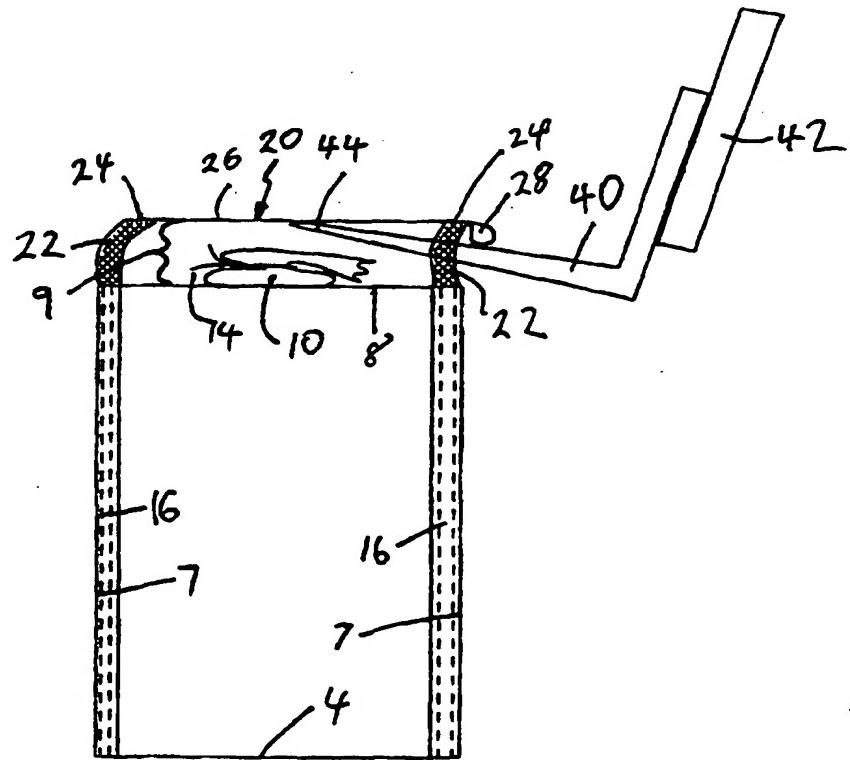
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(54) Title: LIFTING DEVICE FOR BULK TYPE BAGS

## (57) Abstract

The invention relates to lifting mechanisms for bulk type bags. The lift mechanism (20) generally is a structure made from straps (22) of fabric which can be formed with a bulk bag (2) or attached to as desired. The lift mechanism (20) includes an opening/guidance means (28) which can interact with a tyne (40) or other implement of a lifting apparatus (42), to provide an opening (9) into which the tyne can proceed. In other embodiment the opening/guidance means is in the form of a spring or bias means (52) to keep the lifting straps (22) or flexible lift means away from a bag top cover (8), so as to provide an opening (9).



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## Lifting Device For Bulk Type Bags

### FIELD OF THE INVENTION

The present invention relates to bulk type product bags and lifting mechanisms and devices which are embodied in the bag or could be attached thereto as a retro-fit.

### 5 BACKGROUND OF THE INVENTION

Bulk product bags of the woven type are generally used to contain powdered and granulated chemical products. For transport and loading purposes the bulk product bags are generally mounted on pallets. Such pallets are hired, however if the final destination of the pallet is a relatively small operator there is an extremely high risk of the operator not returning the pallet 10 to the owner. Alternatively the operators are located at a remote locality and the return of the pallet is difficult. Lost pallets amount to many thousands of dollars annually.

An attempt to remove the need for pallets in the transport system is as depicted in Figures 1 where lift loops are introduced. However, the lift loops do not stand upright as in fig 1, they lie near to the bag as in fig 2. Accordingly, a fork lift driver needs to thread a lifting tyne into each 15 pair of lift loops, generally requiring the lift driver to dismount his vehicle twice, once to engage the loops and a second to disengage the loops. This detracts from the productivity of the task because of the lift driver not doing lifting only, because he has to attach the loops to the tynes or by requiring an additional person to help in the task.

### SUMMARY OF THE INVENTION

20 The invention provides a bag which includes a lifting device attached to the bag for the purpose of lifting the bag, the lifting device being moveable relative to the bag to define a space or opening for receiving a tyne or other implement of a lifting mechanism, said lifting device further including an opening/guidance means adapted to facilitate the formation of said opening and or guide said tyne or other implement to said opening formed between said lifting device 25 and said bag.

Preferably said opening/guidance means is positioned on said lifting device to be pre-engaged by said tyne or other implement of said lifting mechanism for thereby moving said lifting device from the bag to define said space or said opening for receiving said tyne.

30 Preferably the opening/guidance means is at least one flap which hangs over the side or sides of said bag.

Preferably said opening/guidance means includes at least a portion which is rigid, semi rigid or weighted.

Preferably the opening/guidance means includes a large diameter rope, cord or tube.

Preferably the opening/guidance means has a diameter or transverse dimension in the range

5 20mm to 50mm.

Preferably said opening/guidance means includes a flap of fabric.

Preferably said opening/guidance means includes a pocket, filled with a weight.

Preferably said opening/guidance means is made to sit away from said bag so as to be readily accessible by said tyne or other implement.

10 Preferably said bag includes at least one lifting means to be able to be attached temporarily or permanently to said lifting device.

Preferably said opening/guidance means depends from said lifting means or otherwise cooperates with said lifting means to direct said tyne to said opening.

15 Preferably at least one lifting means and said lifting device are formed from a single sheet of fabric.

Preferably when there is more than one lifting means they are each located at a corner on the top of said bag and are connected, together by straps on said lifting device in one of the following manners: along the periphery of said lifting device, diagonally across said lifting device, along some of the peripheries of said lifting device, or a combination of these.

20 The invention also provides a lifting device having at least one engagement means adapted to engage at least one support mechanism attached to a load to be lifted, said lifting device being moveable relative to said load when attached to said load so as to define a space or opening for receiving a tyne or other implement of a lifting device, said lifting device further including an opening/guidance means adapted to create an opening in association with said tyne or other implement and to direct said tyne or other implement to engage said lifting device, to then lift said at least one engagement means and said at least one support mechanism and subsequently lift said load.

25 Preferably when the lifting device is integral with a bag carrying the load to be lifted, said at least one engagement means and said at least one support mechanism are provided in a single item or strap.

The invention further provides lifting device co-operable with a load to facilitate lifting of a load, including:

flexible lift means connected, or adapted to be connected, to a load at one location or a plurality of spaced locations and lying on the load when not in use, said flexible lift means being

5 engageable over a lifting tyne or other lifting element, for lifting the load; and

opening/guidance means associated with said flexible lift means and pre-engageable by said tyne or other element to facilitate bringing of the tyne or other element under the flexible lift means and thereby engagement of the flexible lift means over the tyne between said spaced locations if there is more than one or on either side if there is only one location.

10 Preferably said opening/guidance means includes a flap portion.

Preferably the load is a bulk product bag.

Preferably said flexible lift means when connected or adapted to be connected, to a load at a plurality of spaced locations has an engagement means at each spaced location.

Preferably pairs or sets of engagement means are connected together by a connection means.

15 Preferably said flexible lift means is formed as an extension of one or two sides of a bag.

Preferably said extension includes at least one opening/guidance means there on.

Preferably extension creates an opening for said tyne or other implement by means of a spring means or bias means to force said extension away from a top cover of said bag.

Preferably said flexible lift means is a first strap means connected between two spaced

20 locations on a first end and a second strap means connected between two other spaced locations on a second end, which is opposite to said first end.

Preferably said opening/guidance means cooperates with said tyne or said other implement, to create an opening for receiving said tyne or other implement, to position said tyne or other implement under said lifting device.

25 Preferably said opening/guidance means includes a pocket which holds a weight or a spring means.

Preferably said opening/guidance means hangs down from said lifting device.

Preferably said lifting device includes a web means interconnecting said flexible lift means or portions of said lifting device to form a generally planar lifting device.

Preferably said web means also guides said tynes so that said tynes are located between said load and said lifting device.

Preferably wherein there is at least one engagement means per apex or corner of said load to be lifted.

5 Preferably there are four engagement means.

Preferably said at least one engagement means are closable hooks.

Preferably said lifting device adapted to transmit compressive forces.

Preferably said lifting device is adapted to transmit tensile forces.

Preferably said lifting device includes connection or strap means located around its periphery.

10 Preferably there is one of said opening/guidance means along at least one perimeter section of said lifting device.

Preferably said lifting device includes a generally circular central structure, from which radial connection means extend to a means by which said lifting device can engage said load.

Preferably said lifting device includes access means to a load which is to be carried.

15 Preferably said lifting device is formed integrally with a bag of the bulk type.

Preferably said engagement means are straps to engage said bag.

Preferably said web means is wear and tear resistant.

Preferably said web means is capable of transmitting tensile forces.

Preferably said web means is capable of transmitting compressive forces.

20 Preferably said web means is capable of transmitting both compressive and tensile forces.

The invention also provides a bag which includes a lifting device mentioned above.

The invention also provides a bag which includes a lifting device mentioned above, further including reinforcement means along the length of an edge of said bag.

25 The invention also provides a bag which includes a lifting device mentioned above, further including reinforcement means along the length of an edge of said bag wherein said reinforcement means is located either inside or outside said bag.

The invention also provides a method of constructing a bulk type bag including the connection to or formation together with said bulk type bag of a lifting device as described above as a permanent connection.

5 The invention also provides a method of constructing a bulk type bag including the connection to or formation together with said bulk type bag of a lifting device as described above as a temporary connection.

Preferably hooks on said lifting device are used to engage loops on said bulk type bag.

Preferably said lifting device includes engagement means which are straps, which simultaneously serve the purpose of support or lift means for the bag.

10 The provision of the opening/guidance means which directs the tynes of a lifting device such as fork lift provides the advantage to the fork lift operator not needing to have to engage a pallet at the base nor does the operator have to engage the loops of a filled bulk bag individually. That is once the bag has been fully loaded the bag is ready to be lifted by said fork lift without assistance from a third party or the use of a pallet.

15 In the passages above, under the heading "Summary of the Invention", some features are described as being preferable because at the time of writing these features were considered to be preferable. In the future, it may be necessary to consider one of or a combination of some of these features to be essential to the invention.

#### BRIEF DESCRIPTION OF THE DRAWINGS

20 Embodiments of the present invention will now be described, by way of example only with reference to the accompanying drawings, in which:

Figure 1 is perspective view of a conventional bulk bag showing filling tube and lifting loops upwardly extended;

25 Figure 2 is a perspective view of the bulk bag of fig 1, showing the filling tube and lifting loops supported by the bulk bag which is filled with product;

Figure 3 is a perspective view of a lifting device being an embodiment of the present invention, extended upwardly from a bulk bag to which it is attached;

Figure 4 is a perspective view of the lifting device of figure 3 which is attached and supported by the bulk bag which is filled with product;

30 Figure 5 is a perspective view of a second embodiment;

- Figure 6 is a perspective view of a third embodiment;  
Figures 7, 8 and 9 illustrate the use of the device of Figures 3 and 4;  
Figure 10 illustrates a fourth embodiment of the invention;  
Figure 11 illustrates a fifth embodiment of the invention; and  
5 Figures 12 to 15 illustrate some of the possible configurations of bulk bags to which the invention can be applied.

#### **DETAILED DESCRIPTION OF THE EMBODIMENTS**

Illustrated in Figure 1 is a conventional prior art bulk bag 2 which is of the type which includes a fabric square or rectangular base 4 from which four fabric sides 6 extend. The sides 6 are joined to each other by stitching or otherwise, at seams 7. At the periphery of the sides 6 is attached a fabric cover 8. The sides 6 and base 4 can be made up of a single item of fabric with the joins being at the seams 7, and at the intersection of the cover 8 with the tops of the sides 6. At each of the corners or apexes of cover 8 there are attached four support mechanisms or lifting loops 12 and associated strengthening ribs 16 (attached to bag 2 and lifting loops 12) which extend downwardly from the lifting loops 12, along the seams 7. The lifting loops 12 can be formed integrally with the strengthening ribs 16 as depicted, or the loops 12 and ribs 16 can be manufactured separately and attached together and then to the bag by stitching or other means. The loops 12 and ribs 16 could also be formed from the material of the bag 2 itself.

At a convenient central location on the cover 8, is a filling spout 10 and a tie to prevent the 20 contents spilling out. The bulk bag 2 is generally filled with powdered or granulated chemical product.

In figure 2, there is illustrated the conventional prior art bulk bag 2 of figure 1, after it has been filled and before or after a like bulk bag 2 has been stacked on top. The lifting loops 12 of bag 2 are lying flat against the cover 8 as is the filling spout 10.

25 In figure 3 is illustrated a bulk bag 2 which embodies the invention. The bulk bag 2 of figure 3 has parts similar to those of figures 1 and 2, and like parts have been like numbered.

Over the cover 8 is located a lifting device 20 which has four engagement means at each corner of the cover 8, in the form of four lift straps 22. In figure 3 the lift straps 22 are shown in an extended position such that the lifting device 20 is separated by a gap 9 from the cover 8. Such 30 positioning would occur if the straps 22 are able to transmit compressive forces, or alternatively a tyne of a lifting device is inserted and attempting to lift bag 2. If no ability to transmit

compressive forces is present, then the straps 22 will more than likely adopt a position as in figure 4 where the lifting device 20 is sitting on the cover 8. The lift straps 22 on the left side of the lifting device 20 depicted in fig 3, are connected by a connection means in the form of a connection strap 24, however other connection means such as flat cord, circular cord or spiral wound cord could be used. The strap 24 is preferably constructed of a laminate of high tensile strength materials such as woven webbing of natural or synthetic fibres. Together the lift straps 22 and the corresponding connection means 24 make up a flexible lift means.

The straps 24 can also be manufactured out of metals such as steel or high strength aluminium. Connecting the left connection strap 24 with the right connection strap 24 is a guiding/tension member 26 (which may also be called a web or web means). The guiding/tension member 26 can transmit some of the load of the bag 2 to the tyne 40 (see figs 7 to 9), as well as serve the purpose of guiding the tyne 40 so that it passes through to the other side of the lifting device 20. Preferably the guiding/tension member 26 is wear resistant and tear resistant. The guiding/tension member 26 can be formed from a woven sheet fabric such as the type having 15 tapes of oriented high strength polypropylene, or it may be manufactured from a sheet of metal such as steel or aluminium. In the case of fabric, the guiding/tension member 26 will not resist compressive forces which would tend to draw the left and right hand side connection straps 24 together. On the other hand, a sheet metal version will resist such compressive forces. The sheet metal can be included in a pocket of fabric of the guiding/tension member 26 if desired, 20 and can be provided as a series of strengthening ribs enclosed in the fabric of guiding/tension member 26.

The guiding/tension member 26 works in conjunction with an opening/guidance means in the form of an opening/guidance flap 28. The opening/guidance flap 28 is pre-engaged by the tyne of a fork lift, so that when the opening/guidance flap 28 is lifted, it will lift at least the 25 periphery of the guiding/tension member 26 so as to form an opening between the guiding/tension member 26 and the cover 8 of the bag 2 below it. The opening/guidance flap 28 serves as an opening means in that engagement of it by the tyne provides an opening into which the tyne can be inserted. The opening/guidance means serves its guidance purpose once the tyne has engaged it, because the opening/guidance means guides the tyne to a point below 30 the periphery of the guiding/tension member 26, near to where the opening/guidance means 28 is attached to the guiding/tension member 26.

The opening/guidance flap 28 is formed from a pocket of fabric in which is captured a weight such as a metal rod. However, sand or the like or a plastics tube will also fulfil this task. The opening/guidance means will fulfil its task also if it is rigid or semi rigid, or rigid in part or semi rigid in part. If desired, the opening/guidance means can be constructed from fabric with 5 no mass and or rigidity, as long as the fabric of the opening/guidance means extends over the side 6. If desired the opening/guidance means of this form can completely surround the lifting device 20 so that access to the lifting device can be from any side 6.

The purpose of the opening/guidance flap 28 is more clearly illustrated in figures 7, 8 and 9. As 10 illustrated in figure 7 the opening/guidance flap 28 acts as the first point of engagement of two tynes 40 of a fork lift 42 of which only one is illustrated because of the illustration being a side elevation.. The opening/guidance flap 28 when moved by the tynes 4 forms an opening 9 between the lifting device 20 and the cover 8 of the bag, to receive the tyne 40.

The opening/guidance flap 28 also gives the tyne 40 an introduction to the underside of the guiding/tension member 26 along which the fork lift driver moves the tyne 40 until such time 15 as its tip 44 protrudes past the connection strap 24 on the left hand side of the device 20 illustrated in figs 7, 8 and 9. Once the tynes 40 have adopted this position, then the fork lift driver levels the tyne 40 as in fig 9. The fork lift driver is now in a position to lift the bulk bag 2 and its contained product without having to leave his driving and operating seat. At this point, as the tyne 40 is raised the connection straps 24 bear the tensile forces, from the weight of the 20 product, transmitted to the connection strap 24, by means of lift strap 22 and strengthening ribs 16 down the seam 7. While the use of a tapered tyne 40 provides an insertion benefit, any shape of tyne can be used with the invention, as long as the appropriate dimensions of the lifting device 20 and the openings and the lift straps are sized appropriately.

Preferably the guiding/tension member 26 includes a slit 30, which may be stitched or 25 otherwise reinforced if made of fabric, or an aperture if sheet metal, through which the filling spout 10 and tie 14 can be accessed. Other arrangements could be utilised, such as the positioning of the filling spout to the side of the bag 2 or even providing an extended version of the filling spout allowing filling from the side. Alternatively the lifting device could be attached after filling and later detached after the bag arrives at its destination.

30 If desired, additional front and rear connection straps 24 can be added to the lifting device 20 of figure 3 so that connection straps lie along the whole of the periphery of the lifting device 20. To all four of the connection straps 24 there can be added an opening/guidance flap 28, so that

a fork lift driver can approach a full bulk bag 2 from any of the directions normal to the four sides.

- If the guiding/tension member 26 is manufactured from sheet metal or includes sheet metal, the fork lift driver may be able to approach the lifting device 20 from any angle, providing an  
5 opening/guidance flap 28 is on the or each periphery of the lifting device 20.

The lifting straps 22 can be of a relatively stiff material (ie, transmit compressive forces) so that they can hold the lifting device 20 clear of the cover 8. While such a feature can have advantages, the main role of the lifting straps 22 is to carry the weight of the bag suspended from the connecting straps 24.

- 10 Illustrated in Figure 4 is the embodiment of Figure 3 as it would be at rest or after a like bag has been placed on top of it with the lifting straps 22 collapsed and the guiding/tension member 26 making contact with the cover 8 and resting substantially against it. In fig 4, the opening 9 shown in fig 3, is no longer present.

- 15 Illustrated in Figure 5 is a second embodiment of the invention and this embodiment includes like parts to that Figures 3 and 4. These like parts have been like numbered. Instead of the connecting straps 24 which run along the left hand and right hand sides of the embodiment as depicted in figs 3 and 4, a centre connecting ring 32 is positioned around the slit 30. Extending radially outward from the ring 32 are radial connecting straps 34. The radial connecting straps proceed to the corner of the guiding/tension member 26 at which is located the lifting straps 22.  
20 This embodiment functions in the same way as the embodiment of figs 3 and 4.

- The lifting device 20 of Figures 3, 4 and 5 are integrally formed with the bulk bag 2. However, the lifting device 20 can be made separately as is illustrated in Figure 6. The lifting device 20 of fig 6 is very similar to that of Figure 3 expect that the lifting straps 22 in fig 3, are replaced by other engagement means being lifting hooks 23. The lifting hooks 23 have a closing  
25 mechanism or gate 25 to close the open portion of the hook 23 to prevent the carry loops 12 from separating from the hook 23. The lifting device 20 of Figure 6 can be added to any bag having four carry loops 12, which is desired to be carried. A similarly constructed lifting device having two or three engagement means can be used with bags having only 2 or 3 lifting loops.

- 30 The hooks 23 can be replaced by a strap (not illustrated) which links one end of the connecting strap 24 to other end of the same connecting strap 24 after having been threaded through lifting loops 12 of a prior art bag. Such a strap could be joined by means of a D-shaped bolt or buckle or other interconnection means which will not undo during the lifting operation.

Another embodiment illustrated in figure 10 can be manufactured by combining the lift strap, and a bag connection of previous embodiments together with two opposite walls. The opposite side walls 6a can be extended up and over the cover 8 of the bag 2 in one piece to form a lifting sling 26a. The cover 8 of the bag can be joined to the lifting sling 26a by stitching or other joins 50. In figure 10 a single opening/guidance flap 28 is shown but a second one on the opposite side could be included. In figure 10 an access slit 30 is shown parallel to the tensile stress direction in the sling 26a since this will provide greater strength and greater resistance by the slit 30 to tear open.

The embodiment of Figure 10 removes the specific lifting or connection straps 24 from the previous embodiments, and replaces them with material from which the bag 2 has been manufactured.

In figure 11 is a bag 2 like figure 10, but of a different construction. Figure 11 shows two pieces of plastics strip material 52 (which could be metal) inserted between an upper fabric part 53 and a lower fabric part 55 of the lift sling 26a. Alternatively the plastics strip material 52 could be simply inserted between the lift sling 26a and the top of the bag 8. In both arrangements the plastics strip material 52 will adopt a shape similar to and act like a leaf spring. The distance between the opposite seams 50 is greater along the sling 26a than along the bag cover 8 and the length of the plastics strips 52 is approximately equal to the length of the sling 26a from the seam 50 to the opposite side of the seam 50. The springiness and the compression of the strip 52 creates a tyne entry gap 54. The springiness of strip 52 is not destroyed once another bag 2 has been placed on top of it, and this is achieved by the selection of the material.

In another embodiment (not illustrated) the lifting strap can extend diagonally from one corner of a square or rectangular bag to another diametrically opposite corner, or be attached to diametrically opposite sides of a non square or rectangular shaped bag. From the lifting strap an opening/guidance means similar to opening/guidance flap 28 can extend. However as the strap is more centrally located the flap of the opening/guidance means will need to be longer in parts, so that the weight can extend down the side of the bag.

With the above described embodiment the provision of a weighted flap portion on all four sides of a rectangular bag, may help to take into account a non perpendicular movement of the tynes relative to the strap, connection strap or web.

The embodiment of Figures 3, 4 and 5 are such that an operator of a fork lift would not need to get down from their driver's seat preparatory to lifting the bulk bag 2, nor would they for the embodiment of Figure 6, assuming the lifting device will have been attached to the bag at the time of filling the bag or prior to its lifting. Each embodiment removes the need for a pallet.

- 5 The lifting device 20 can be constructed as a disposable item, so that the bags do not need to be returned.

If the lifting device 20 is detachable, then it can be given to the transporters for their use.

The embodiments of Figs 3, 4 and 5 are manufactured so that the lifting device 20 forms a part of each bag and remains an integral part of it for the life of that bag. On the other hand, the fig

- 10 6 embodiment can be retrofitted to existing bags that have corner lifting loops in which case the lifting device 20 of Fig 6 may be removed and retained at one site, if desired, before the bags are transported to another remote site.

Figs 12, 13, 14 and 15 illustrate some of the types of configurations of bulk bags 2 with which an embodiment of the invention can be used with. In figure 12 the lift loops 12 are in the middle of each of the sides 6 and a reinforcing rib 16 is sewn or attached to the sides 6 and extend from the lift loops 12 to the base 4. In figure 13 the construction is similar to figure 12 except that the lift loops 12 begin at the top and in the middle of each side 6 and terminate at the top and in the middle of the adjacent side 6. In figure 14 the bulk bag is generally cylindrical with a single side 6 sewn or otherwise attached to a base 4 which is circular. This embodiment also has the reinforcing 16 extending from the lifting loops 12 to the base 4. In figure 15 each side has several reinforcing ribs 16 extending from the top of each side to the base 4. The lifting loops 12 do not start and finish at the top corners of the bag 2 in this embodiment. They begin at one side 6 and terminate on an adjacent side 6 which is closest to the point at which the lifting loop 12 begins, but the start and end points of the lifting loops 12 are much closer together than the bag of fig 13. For the invention to be applicable to the bags of figs 12 to 15, modifications to the lifting devices 20 described above will be required in respect of its shape and the positioning and numbers of hooks etc.

The foregoing describes embodiments of the present invention and modifications by those skilled in the art can be made thereto without departing from the scope of the present invention.

**CLAIMS**

1. A bag which includes a lifting device attached to the bag for the purpose of lifting the bag, the lifting device being moveable relative to the bag to define a space or opening for receiving a tyne or other implement of a lifting mechanism, said lifting device further including  
5 an opening/guidance means adapted to facilitate the formation of said opening and or guide said tyne or other implement to said opening formed between said lifting device and said bag.
2. A bag as claimed in claim 1, wherein said opening/guidance means is positioned on said lifting device to be pre-engaged by said tyne or other implement of said lifting mechanism for thereby moving said lifting device from the bag to define said space or said opening for  
10 receiving said tyne.
3. A bag as claimed in any one of the preceding claims, wherein the opening/guidance means is at least one flap which hangs over the side or sides of said bag.
4. A bag as claimed in any one of the preceding claims, wherein said opening/guidance means includes at least a portion which is rigid, semi rigid or weighted.
- 15 5. A bag as claimed in any one of the preceding claims, wherein the opening/guidance means includes a large diameter rope, cord or tube.
6. A bag as claimed in claim 4 or 5, wherein the opening/guidance means has a diameter or transverse dimension in the range 20mm to 50mm.
7. A bag as claimed in any one of the preceding claims, wherein said opening/guidance  
20 means includes a flap of fabric.
8. A bag as claimed in any one of the preceding claims, wherein said opening/guidance means includes a pocket, filled with a weight.
9. A bag as claimed in any one of the preceding claims, wherein said opening/guidance means is made to sit away from said bag so as to be readily accessible by said tyne or other  
25 implement.
10. A bag as claimed in any one of the preceding claims, wherein said bag includes at least one lifting means to be able to be attached temporarily or permanently to said lifting device.
11. A bag as claimed in claim 8, wherein said opening/guidance means depends from said lifting means or otherwise cooperates with said lifting means to direct said tyne to said opening.

12. A bag as claimed in any claim 1, wherein said at least one lifting means and said lifting device are formed from a single sheet of fabric.
13. A bag as claimed in any one of the preceding claims, wherein when there is more than one lifting means they are each located at a corner on the top of said bag and are connected, together by straps on said lifting device in one of the following manners: along the periphery of said lifting device, diagonally across said lifting device, along some of the peripheries of said lifting device, or a combination of these.
14. A lifting device having at least one engagement means adapted to engage at least one support mechanism attached to a load to be lifted, said lifting device being moveable relative to said load when attached to said load so as to define a space or opening for receiving a tyne or other implement of a lifting device, said lifting device further including an opening/guidance means adapted to create an opening in association with said tyne or other implement and to direct said tyne or other implement to engage said lifting device, to then lift said at least one engagement means and said at least one support mechanism and subsequently lift said load.
15. 15. A lifting device as claimed in claim 14, wherein when the lifting device is integral with a bag carrying the load to be lifted, said at least one engagement means and said at least one support mechanism are provided in a single item or strap.
16. A lifting device co-operable with a load to facilitate lifting of a load, including:  
flexible lift means connected, or adapted to be connected, to a load at one location or a plurality  
20 of spaced locations and lying on the load when not in use, said flexible lift means being  
engageable over a lifting tyne or other lifting element, for lifting the load; and  
opening/guidance means associated with said flexible lift means and pre-engageable by said  
tyne or other element to facilitate bringing of the tyne or other element under the flexible lift  
means and thereby engagement of the flexible lift means over the tyne between said spaced  
25 locations if there is more than one or on either side if there is only one location.
17. A lifting device as claimed in claim 16, wherein the load is a bulk product bag.
18. A lifting device as claimed in claim 16 or 17, wherein said flexible lift means when  
connected or adapted to be connected, to a load at a plurality of spaced locations has an  
engagement means at each spaced location.
- 30 19. A lifting device as claimed in claim 18 wherein pairs or sets of engagement means are  
connected together by a connection means.

20. A lifting device as claimed in any one of claims 16 to 19, wherein said flexible lift means is a first strap means connected between two spaced locations on a first end and a second strap means connected between two other spaced locations on a second end, which is opposite to said first end.

5 21. A lifting device as claimed in any one of claims 14 to 20, wherein said opening/guidance means cooperates with said tyne or said other implement, to create an opening for receiving said tyne or other implement, to position said tyne or other implement under said lifting device.

10 22. A lifting device as claimed in any one of claims 14 to 21, wherein said opening/guidance means includes a pocket which holds a weight or a spring means.

23. A lifting device as claimed in any one of claims 14 to 22, wherein said opening/guidance means hangs down from said lifting device.

15 24. A lifting device as claimed in any one of claims 14 to 23, wherein said lifting device includes a web means interconnecting said flexible lift means or portions of said lifting device to form a generally planar lifting device.

25. A lifting device as claimed in claim 24, wherein said web means also guides said tynes so that said tynes are located between said load and said lifting device.

20 26. A lifting device as claimed in any one of claims 14, 15, 18, 19 or any one of claims 20 to 25 when dependent upon claims 18 or 19, wherein there is at least one engagement means per apex or corner of said load to be lifted.

27. A lifting device as claimed in claim 26, wherein there are four engagement means.

28. A lifting device as claimed in claims 26 or 27, wherein said at least one engagement means are closable hooks.

25 29. A lifting device as claimed in any one of claims 14 to 28, wherein said lifting device adapted to transmit compressive forces.

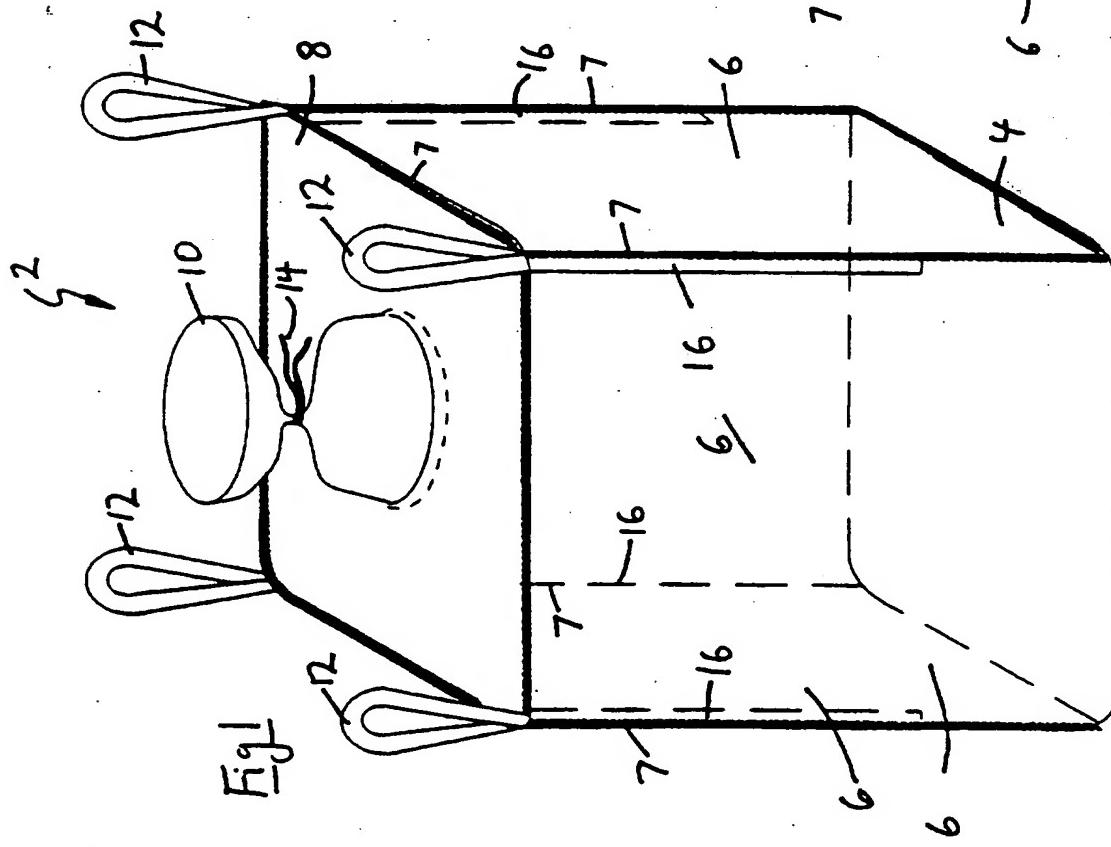
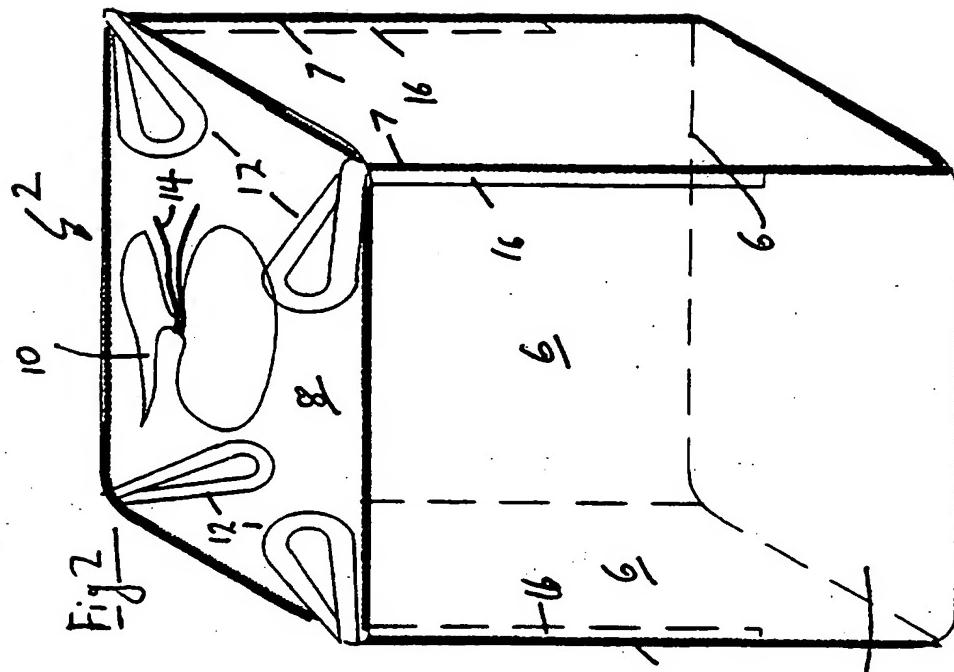
30. A lifting device as claimed in any one of claims 14 to 29, wherein said lifting device is adapted to transmit tensile forces.

31. A lifting device as claimed in any one of claims 14 to 30, wherein said lifting device includes connection or strap means located around its periphery.

32. A lifting device as claimed in any one of claims 14 to 31, wherein there is one of said opening/guidance means along at least one perimeter section of said lifting device.
33. A lifting device as claimed in any one of claims 14 to 32, wherein said lifting device includes a generally circular central structure, from which radial connection means extend to a means by which said lifting device can engage said load.  
5
34. A lifting device as claimed in any one of claims 14 to 33, wherein said lifting device includes access means to a load which is to be carried.
35. A lifting device as claimed in any one of claims 14 to 34, wherein said lifting device is formed integrally with a bag of the bulk type.
- 10 36. A lifting device as claimed in any one of claims 14 or 15, wherein said engagement means are straps to engage said bag.
37. A lifting device as claimed in any one of claims 24 or 25 to 36 only when appended to claim 24, wherein said web means is wear and tear resistant.
- 15 38. A lifting device as claimed in any one of claims 24 or 25 to 37 only when appended to claim 23, wherein said web means is capable of transmitting tensile forces.
39. A lifting device as claimed in any one of claims 24 or 25 to 38 only when appended to claim 23, wherein said web means is capable of transmitting compressive forces.
40. A lifting device as claimed in any one of claims 24 or 25 to 39 only when appended to claim 23, wherein said web means is capable of transmitting both compressive and tensile  
20 forces.
41. A bag which includes a lifting device of any one of claims 14 to 40.
42. A bag as claimed in claim 41 further including reinforcement means along the length of an edge of said bag.
- 25 43. A bag as claimed in claim 42 wherein said reinforcement means is located either inside or outside said bag.
44. A method of constructing a bulk type bag including the connection to or formation together with said bulk type bag of a lifting device as claimed in claims 14 to 40, as a permanent connection.

45. A method of constructing a bulk type bag including the connection to or formation together with said bulk type bag of a lifting device as claimed in claims 14 to 40, as a temporary connection.
46. A method as claimed in claim 45 wherein hooks on said lifting device are used to engage loops on said bulk type bag.
- 5 47. A method as claimed in claim 44 wherein said lifting device includes engagement means which are straps, which simultaneously serve the purpose of support or lift means for the bag.
48. A lifting device as claimed in any one of claims 14, 16, 22 or 23, wherein said 10 opening/guidance means includes a flap portion.
49. A bag having attached to it a lifting device as claimed in any one of claims 16 to 19, wherein said flexible lift means is formed as an extension of one or two sides of a bag.
50. A bag as claimed in claim 49 wherein said extension includes at least one opening/guidance means there on.
- 15 51. A bag as claimed in claim 49 wherein said extension creates an opening for said tyne or other implement by means of a spring means or bias means to force said extension away from a top cover of said bag.

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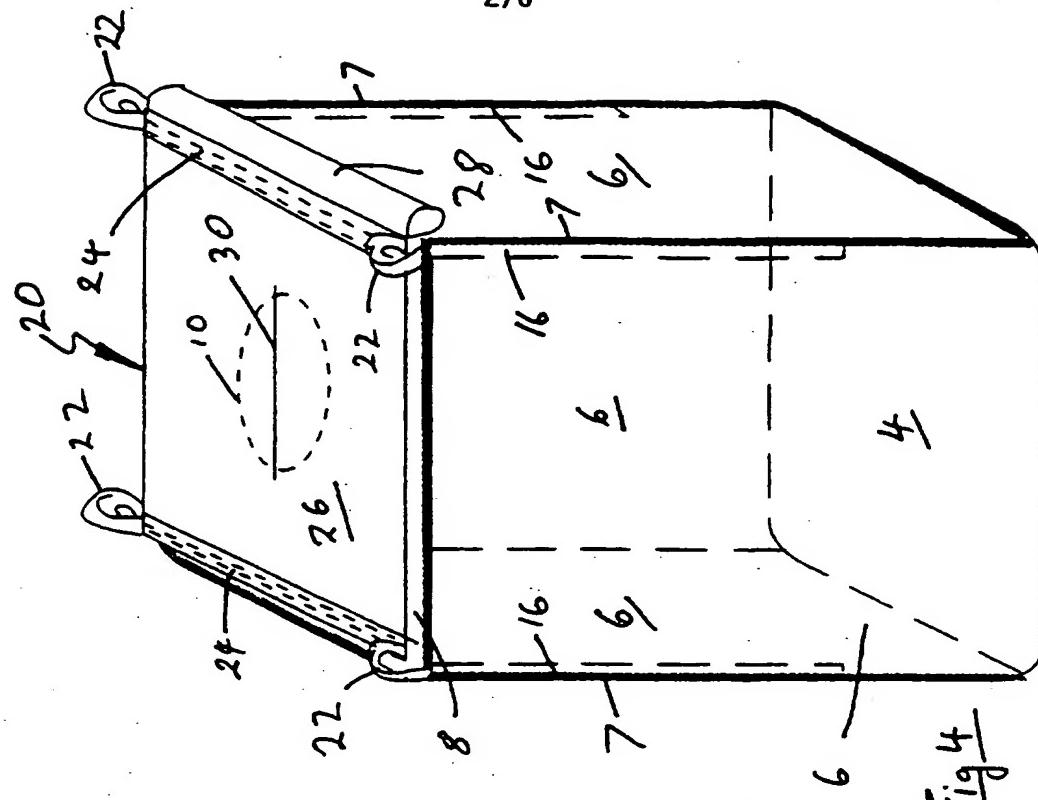


Fig 4

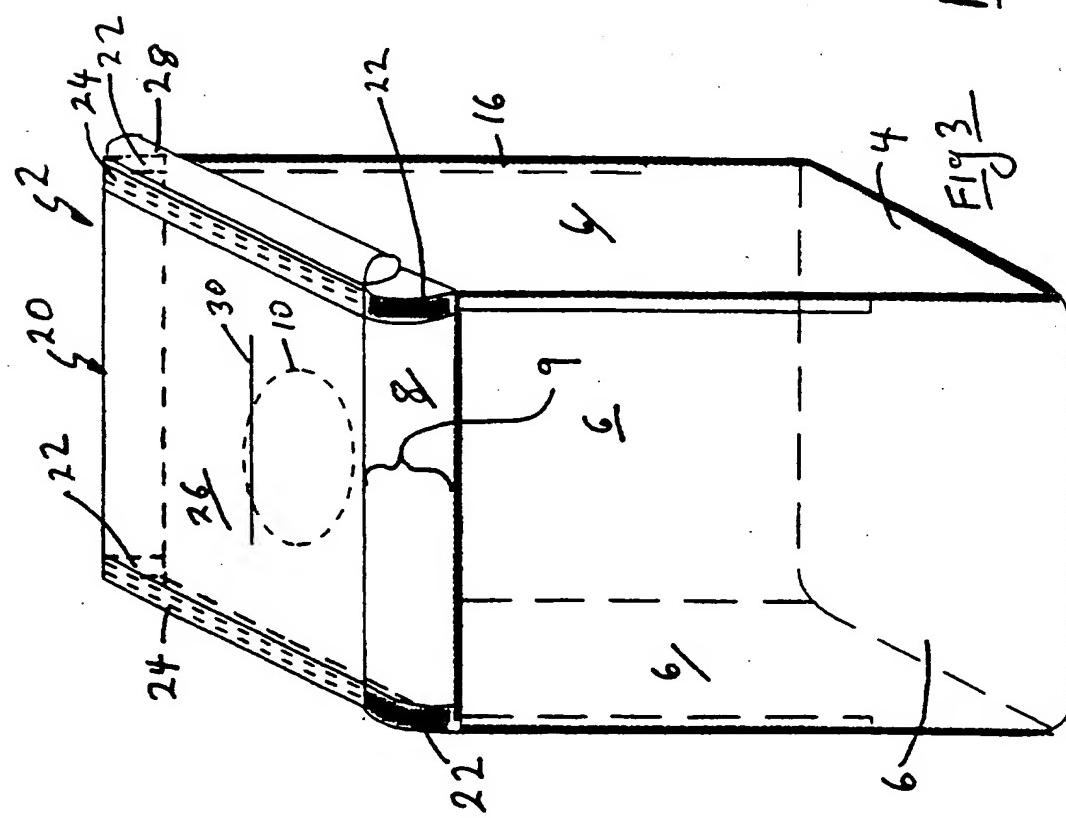
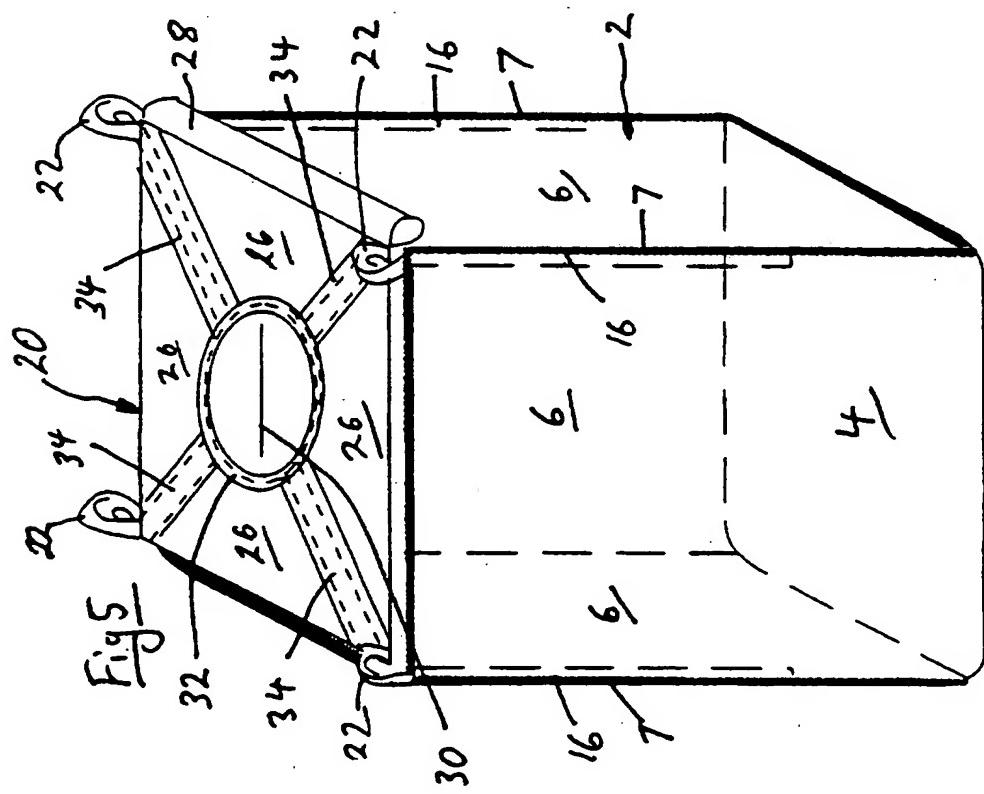
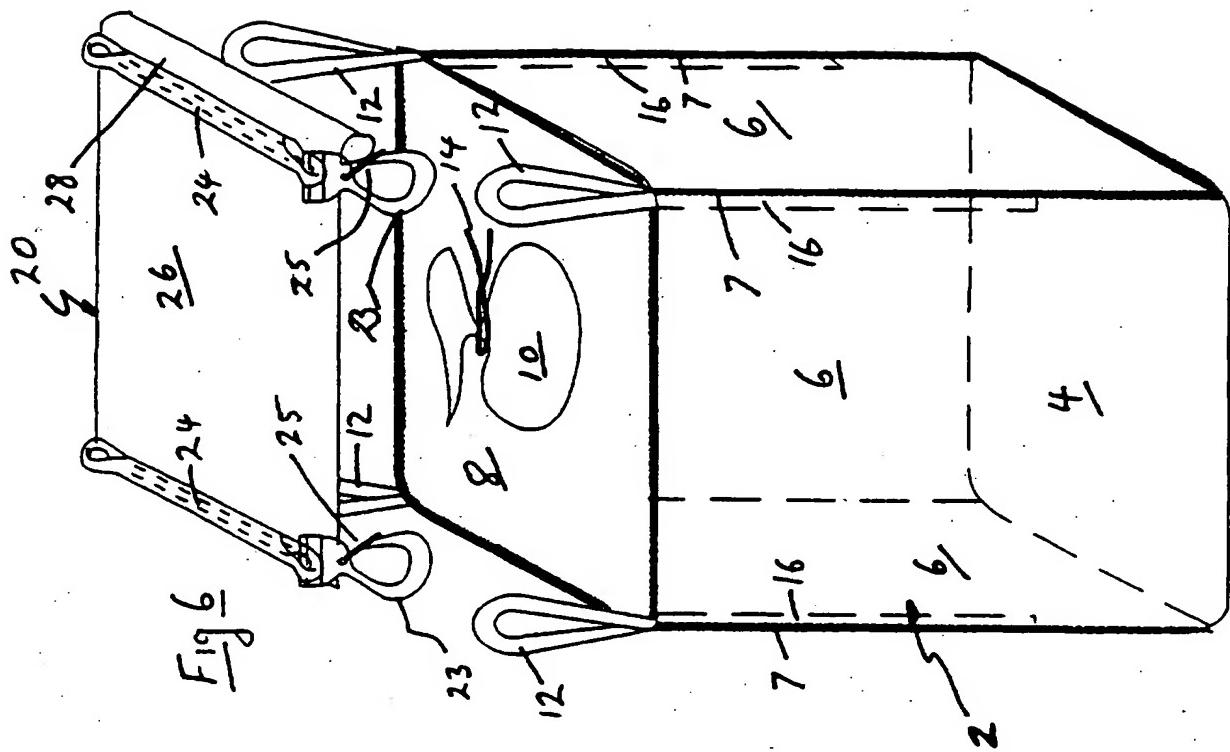
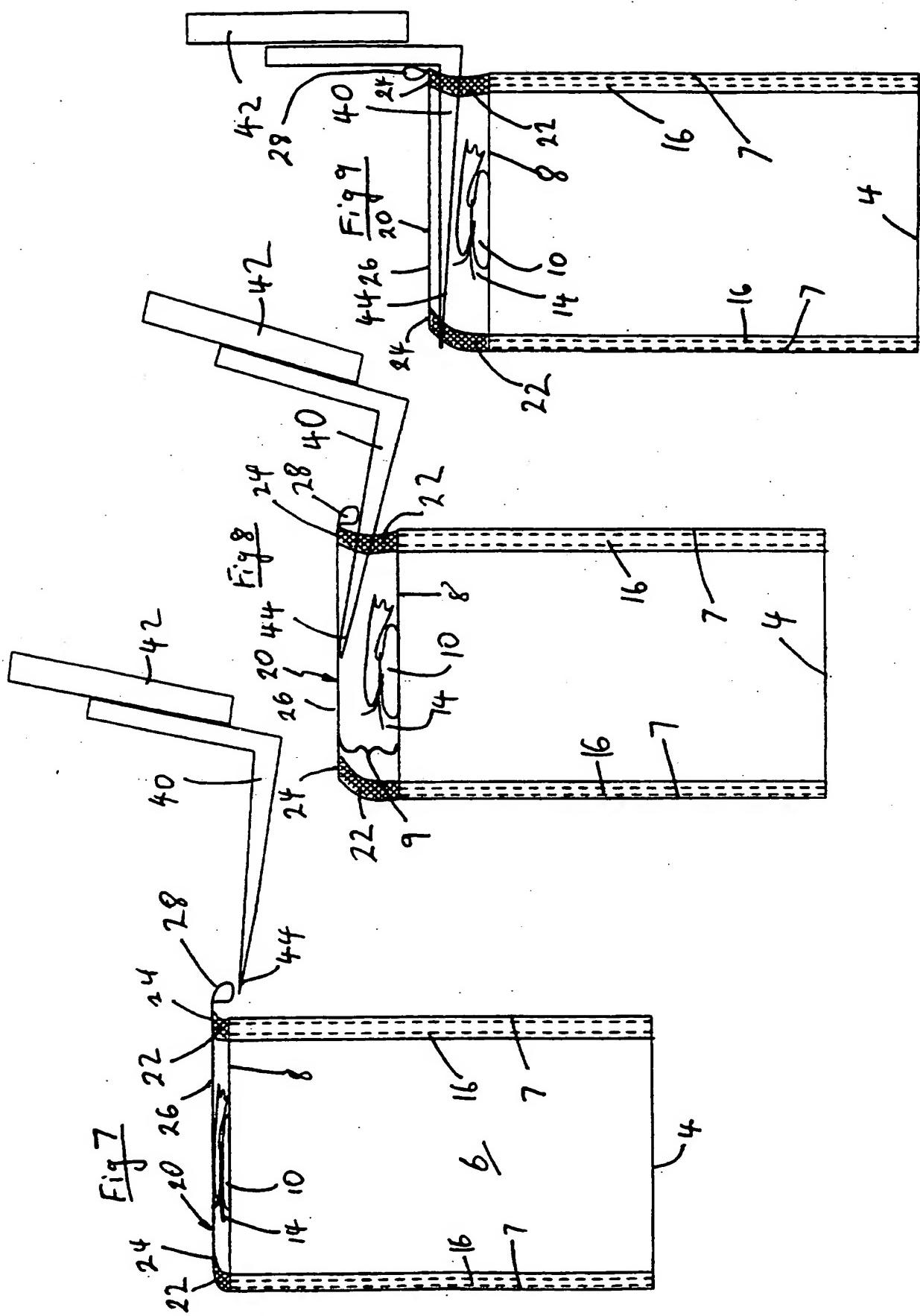


Fig 3

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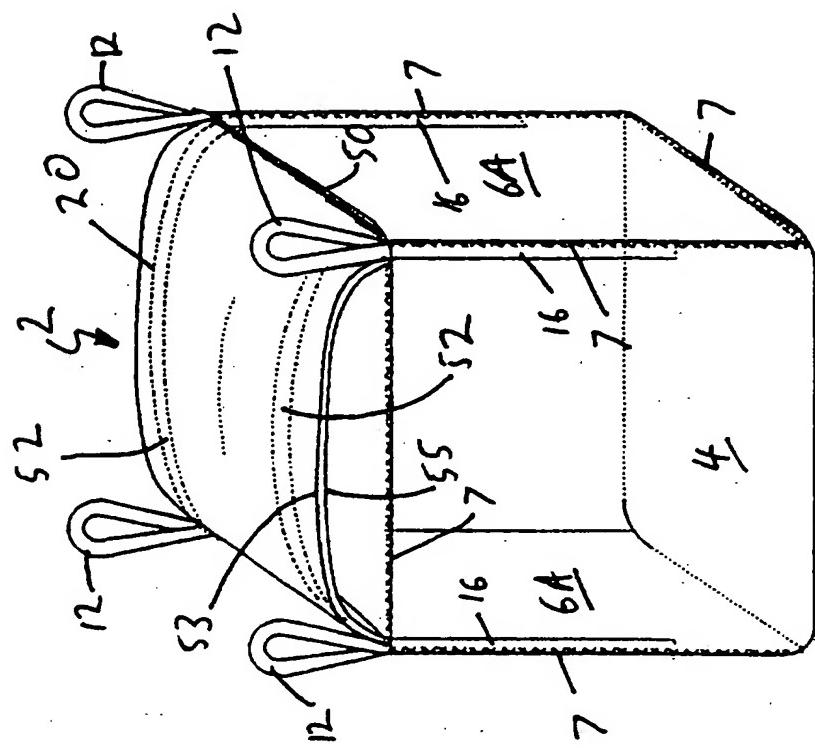


Fig. 11

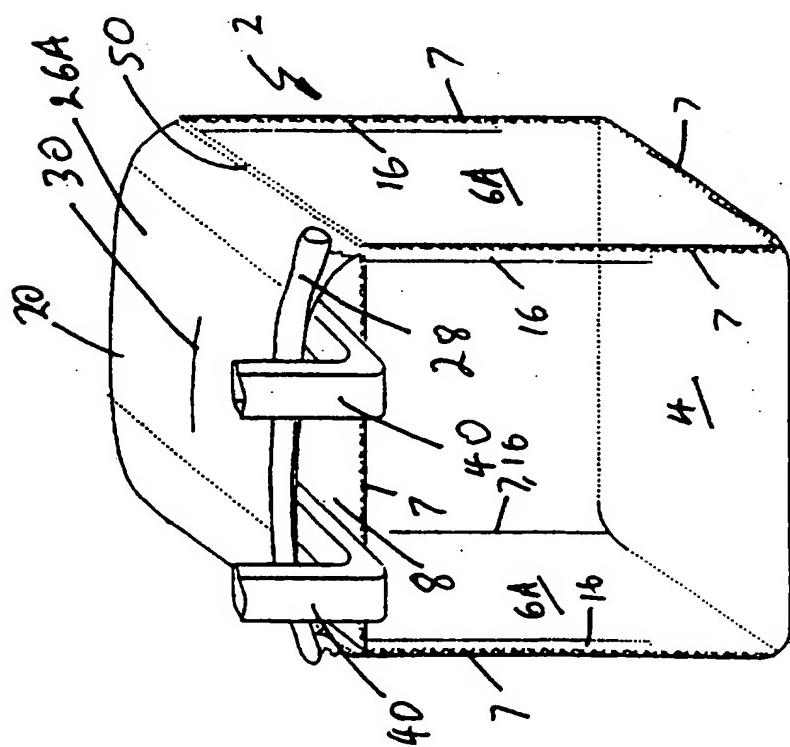
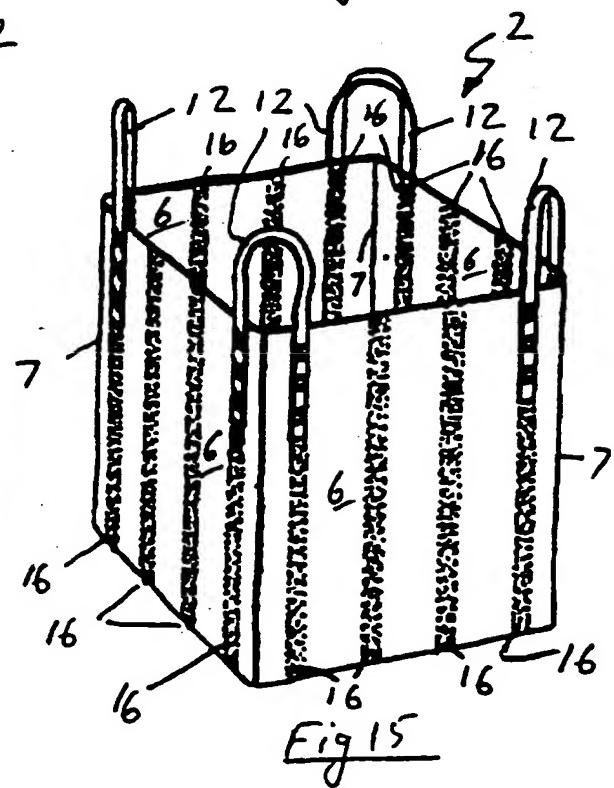
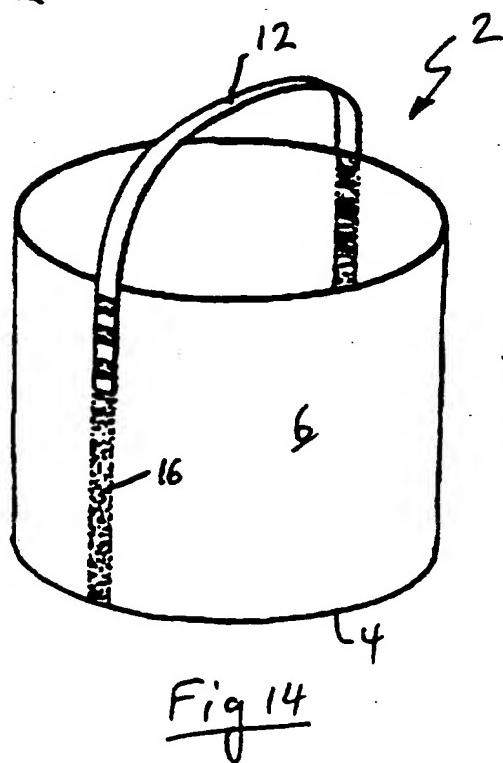
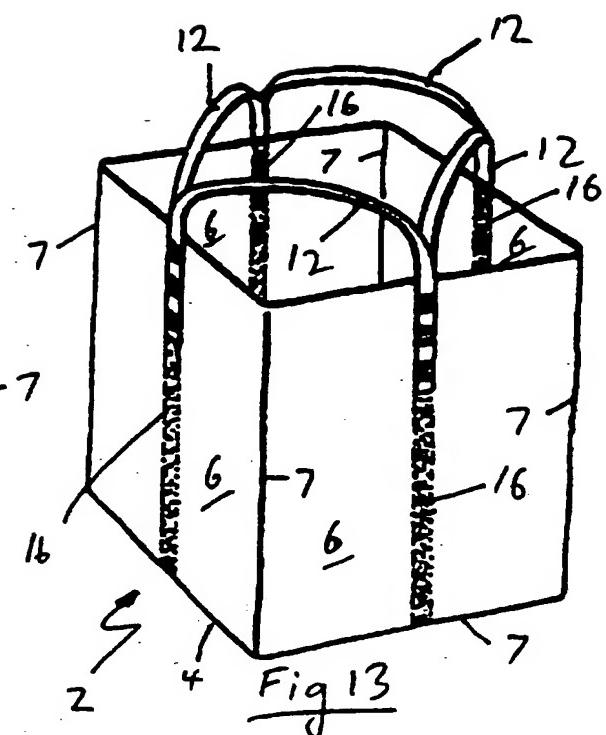
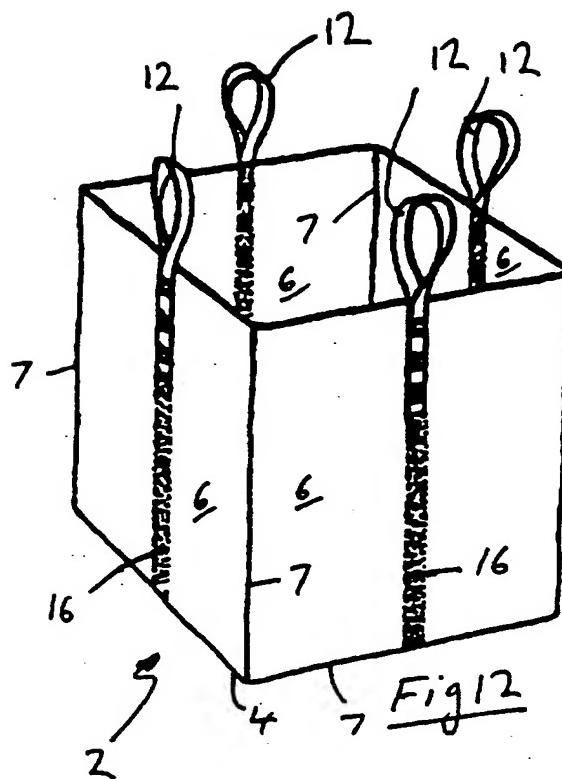


Fig. 10

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## INTERNATIONAL SEARCH REPORT

International Application No.  
PCT/AU 97/00213

**A. CLASSIFICATION OF SUBJECT MATTER**

Int Cl<sup>6</sup>: B65D 88/16, 30/00, 33/14, 90/00, 90/20, 25/22

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)  
IPC B65D 88/16, 30/00, 33/14, 90/00, 90/20, 25/22, B66C 1/-

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched  
AU:IPC as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)  
Derwent: Flexible or bulk, Lift: or fork# or or tine# ortyne#

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DE, 1816627, A (SPAN SET G. S FUR TRANSPORT SYSTEME UNDE TECH. BANDER mbH & Co. KG) 25 June 1970 See figs 1-3	1-52
X	GB, 1097040, A (PETERSON AND HALL ) 29 December 1967 See figs 1 and 2	1-52
X	US, 4499599, A (POLETT et al) 12 February 1985 See figs 1-12	1-52

Further documents are listed in the continuation of Box C

See patent family annex

* Special categories of cited documents:	
"A" document defining the general state of the art which is not considered to be of particular relevance	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"E" earlier document but published on or after the international filing date	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
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"O" document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family
"P" document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search  
5 May 1997

Date of mailing of the international search report

16 MAY 1997

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## INTERNATIONAL SEARCH REPORT

International Application No. PCT/AU 97/00213
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C (Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP, 80126, A (NORSK HYDRO A/S) 1 June 1983 See figures 4 and 5	1-52
X	GB, 2063816, A (MILLER WEBLIFT LTD) 10 June 1981 See figs 1-3(c)	1-52
X	GB, 2098581, A (NATTRASS) 24 November 1982 See figs 1-13	1-52
X	GB, 2094756, A (NATTRASS) 22 September 1982 See figs 1-4	1-52
X	GB, 2205302, A (BOWATER PACKAGING LIMITED) 7 December 1988 See fig 1, page 5, lines 25-35	1, 14, 16, 41, 44, 45, 49
X	GB, 2257417, A (DORTON PACKAGING LTD) 13 January 1993 See fig 2, abstract	1, 14, 16, 41, 44, 45, 49
X	FR, 2608138, A (SHELL CHIME SA) 17 June 1988 See figs 1-6	1, 14, 16, 41, 44, 45, 49
X	AU, 77773/87, A (MERCAROUTE SA) 10 March 1988 See figs 1-9	1, 14, 16, 41 44, 45, 46

**INTERNATIONAL SEARCH REPORT**  
Information on patent family members

International Application No.  
**PCT/AU 97/00213**

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report		Patent Family Member					
DE	1816627						
US	4499599						
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		JP	58099385	NO	813981		
GB	2063816	DK	5109/80	EP	30442	NO	803643
GB	2098581						
GB	2094756						
GB	2205302						
GB	2257417						
FR	2608138						
AU	77773/87	DK	4574/87	EP	259230	FI	873806
		FR	2603259	JP	63134499	NO	873682
		US	4792171	ZA	8706524		

**END OF ANNEX**

